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(54) Title: LIGHT DUTY CLEANING COMPOSITIONS**(57) Abstract**

The invention provides an aqueous, light duty cleaning composition comprising: a) 10-30 % wt in total of alkyl ether sulphate and alkyl sulphate; b) at least 1 % wt alcohol ethoxylate, wherein the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alcohol ethoxylate in the composition is at least 3:1 and not more than 10:1; c) at least 1.5 % wt of at least one amphoteric surfactant, wherein the weight ratio of the total of alkyl ether sulphate and alkyl ether sulphate (a) to said amphoteric is >3:1 and not more than 10:1; d) at least 0.5 % wt of a water-soluble magnesium salt; and; e) less than 4 % ethanol, wherein the level of alkyl benzene sulphonate in the composition is such that the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alkyl benzene sulphonate is greater than 4:1.

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LIGHT DUTY CLEANING COMPOSITIONS

5 Technical Field

The present invention relates to light duty cleaning compositions. Such compositions find particular utility in hand dishwashing processes.

10

Background to the Invention

15 It is well known to formulate light duty cleaning compositions, suitable for use as dishwashing compositions, with alkyl ether sulphate and other anionic surfactants, magnesium, nonionic surfactants and zwitterionic surfactants.

20 EP 0181212 (P&G: 1985) discloses a liquid detergent composition which comprises 4-20% of alkyl sulphate, 5-24% alkyl ether sulphate and 5-20% alkyl benzene sulphonate as the anionic surfactants, magnesium ions, 1-10% of an ethoxylated alcohol nonionic surfactant and 0.25-10%wt of 25 a betaine.

30 Alkyl sulphate will be present in alkyl ether sulphate as obtained from commercial sources. Typical levels of alkyl sulphate in alkyl ether sulphate (3EO) are generally 15-20%, whereas higher ethoxylates contain less alkyl sulphate. Commercially available alkyl ether sulphate (1EO) comprises some 38-44% alkyl sulphate. Thus, in the above-mentioned document the anionic surfactant can be viewed as a mixture of the alkyl benzene sulphonate and an 35 alkyl ether sulphate prepared with low levels of ethoxylation in a typical ratio of at least 1:5.

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In the above-mentioned patent, a poor product is said to be obtained if alkyl benzene sulphonate is eliminated from the formulation. However, in recent years alkyl benzene sulphonate has come under increasing environmental pressure and it is often desirable to remove it from products.

Brief Description of the Invention

10

We have now determined that acceptable light duty cleaning formulations, particularly suitable for hand-dishwashing, can be prepared without or with low levels of alkyl benzene sulphonate and with low levels of alcohol.

15

Detailed Description of the Invention

Accordingly, the present invention provides an aqueous, 20 light duty cleaning composition comprising:

- a) 10-30%wt in total of alkyl ether sulphate and alkyl sulphate,
- 25 b) at least 1%wt alcohol ethoxylate, wherein the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alcohol ethoxylate in the composition is at least 3:1 and not more than 10:1,
- 30 c) at least 1.5%wt of at least one amphoteric surfactant, wherein the weight ratio of the total of alkyl ether sulphate and alkyl ether sulphate (a) to said amphoteric is >3:1 and not more than 10:1,
- 35 d) at least 0.5%wt of a water-soluble magnesium salt,

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e) less than 4% ethanol,

wherein the level of alkyl benzene sulphonate in the composition is such that the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alkyl benzene sulphonate is greater than 4:1.

Typically, the total of alkyl sulphate and alkyl ether sulphate (a) has an average ethoxylation value of less than 2. Suitable average alkyl chain lengths are C₈-C₁₆, with lauryl being particularly preferred.

Preferably, the alcohol ethoxylate (b) has a calculated HLB of 10-20. Suitable alkyl chain lengths range from C₈-C₁₆ with C₁₀-C₁₄ being particularly preferred. The preferred degree of ethoxylation is such that the EO value is above 5, more preferably 7-15, most preferably 10.

Preferably, the amphoteric (c) is selected from the group comprising amine oxide, betaines and mixtures thereof. Amido propyl betaines are particularly preferred. Typical levels of betaine range from 1-5%wt. It is preferred that the overall level of amphoteric is above 1.5%wt.

Typical magnesium sources include sulphates at levels of 0.5-3%.

Typical ethanol levels are such that the composition comprises not more than 2%wt ethanol. Preferably the compositions, particularly those having less than 20% total anionic surfactant present, are essentially free of ethanol. In concentrated compositions ethanol levels of around 1%wt are preferred.

Compositions according to the present invention conveniently comprise 0.5-3%wt of an C₈-C₁₄ alkyl

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monoethanolamide, more preferably 0.9-2.0%wt of lauryl monoethanolamide.

5 Other optional ingredients comprise 0.05-0.5% citric acid monohydrate as a buffer, 0.1-1%wt perfume and/or further minors selected from preservatives, lemon-juice and dyestuffs.

10 Particularly preferred compositions comprise 10-14%wt or 20-27%wt in total of alkyl ether sulphate or alkyl sulphate: the lower levels being used for dilute compositions and the higher levels being used for concentrates.

15 In one preferred set of compositions, the ratio of the total of the alkyl ether sulphate and alkyl sulphate to the betaine is 6-8:1, and the ratio of the alkyl ether sulphate and alkyl sulphate to the total ethoxylated nonionic surfactants present is also 6-8:1. In another 20 preferred set of compositions the ratio of the total of the alkyl ether sulphate and alkyl sulphate to the betaine is 3-5:1 and the ratio of the total of the alkyl ether sulphate and alkyl sulphate to the total ethoxylated nonionic surfactants present is 2-4:1. It is preferable 25 that these ratios hold true for the ratios of the total anionic actives to the betaine and the ethoxylated nonionics, i.e. the anionics comprise alkyl ether sulphate and alkyl sulphate substantially free of other anionic surfactant species.

30 In order that the present invention can be further understood it will be illustrated hereinafter by reference to examples.

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Examples

Four compositions were prepared with formulations as shown in table 1 below. In the table AES is lauryl ether sulphate with an average degree of ethoxylation of 1, 5 Betaine is lauryl amido propyl betaine, LMEA is lauryl monoethanolamide, and Nonionic is C_{11/12/13} alcohol ethoxylate 10EO. The minors were preservative, dyestuffs and lemon juice.

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TABLE 1

	Example 1		Example 2	
	dilute	conc	dilute	conc
5				
AES	13.3	26.6	10.3	20.6
Betaine	1.9	3.8	2.5	4.9
LMEA	1	2	0.9	3.8
10				
Nonionic	1.8	3.6	3.3	6.6
Total (%AD)	18	36	17	35.9
Mg-sulphate (7H ₂ O)	1	2	1	2
15				
Ethanol	-	<1	-	<1
Perfume	0.3	0.5	0.3	0.5
Citric Acid	0.1	0.2	0.1	0.2
Minors	tr	tr	tr	tr
20				
Water	-----to 100%-----			

These products were evaluated as hand dishwashing compositions and found to have acceptable cleaning and grease-cutting properties.

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CLAIMS

1) Aqueous, light duty cleaning composition comprising:

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a) 10-30%wt in total of alkyl ether sulphate and alkyl sulphate,

10

b) at least 1%wt alcohol ethoxylate, wherein the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alcohol ethoxylate in the composition is at least 3:1 and not more than 10:1,

15

c) at least 1.5%wt of at least one amphoteric surfactant, wherein the weight ratio of the total of alkyl ether sulphate and alkyl ether sulphate (a) to said amphoteric is >3:1 and not more than 10:1,

20

d) at least 0.5%wt of a water soluble magnesium salt, and,

25

e) less than 4% ethanol,

wherein the level of alkyl benzene sulphonate in the composition is such that the weight ratio of the total of alkyl ether sulphate and alkyl sulphate (a) to alkyl benzene sulphonate is greater than 4:1.

30

2) Composition according to claim 1 wherein the total alkyl sulphate and alkyl ether sulphate (a) has an average ethoxylation value of less than 2.

35

3) Composition according to claim 1 wherein the alcohol ethoxylate (b) has a calculated HLB of 10-20.

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- 4) Composition according to claim 1 wherein the amphoteric (c) is selected from the group comprising amine oxide, betaines and mixtures thereof.

5

INTERNATIONAL SEARCH REPORT

Int'l Application No

PCT/EP 96/00266

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C11D1/94 C11D1/83

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 181 212 (THE PROCTER & GAMBLE CO.) 14 May 1986 cited in the application see examples 2L,2M see claims ---	1-4
A	US,A,5 269 974 (OFOSU-ASANTE KOFI) 14 December 1993 see column 4, line 45 - column 5, line 22 see column 10, line 10 - column 11, line 52 see example IIIC see claims -----	1-4

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A-0181212	14-05-86	CA-A-	1245941	06-12-88
		DE-A-	3566126	15-12-88
		IE-B-	58219	11-08-93
		JP-B-	6089356	09-11-94
		JP-A-	61166895	28-07-86
		US-A-	4671894	09-06-87
<hr/>				
US-A-5269974	14-12-93	CN-A-	1086843	18-05-94
		EP-A-	0658184	21-06-95
		WO-A-	9405752	17-03-94
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